That the summers of Paris are so very much cooler than those of Reno will probably be a surprise to the French residents of Reno, of whom there are a large number. Now, in Reno, intolerably hot days are unknown, probably because on those days when the temperature exceeds 90° F., the air is always exceedingly dry. To one who has lived in the Middle or Southern States for two or more years, Reno's summers are *imitation* summers, merely. Nobody ever suffers from the effects of the heat in Reno. On many evenings in summer light coats and wraps are worn on Reno's streets. Now, since the average seasonal excess (on a basis of 86°F. or 30°C.) is 30°F. at Paris, as against 177°F. at Reno, it follows that the average Paris summer must be cold. Perhaps this is one reason why thousands of Louisianians and other southerners are so fond of spending the summer season in the capital of France.

It seems to me that comparative summer-temperature tables prepared in the manner suggested by Angot for all the Weather Bureau stations in the United States which claim to be summer resorts should prove both interesting and valuable. It would be highly interesting, for instance, to compare the summers of Asheville, Lake Minnetonka, Colorado Springs, Reno, and San Francisco.

At first thought, it seemed to me that the Angot method would enable us to find a numerical expression for "discomfort degrees" in summer, but after looking into the subject more closely it occurred to me that without the humidity element of the climate, this could not be. To those who are familiar with the climates of San Francisco and Reno, it must be evident that a temperature of 86°F. and a relative humidity of 82 per cent stand for a greater number of discomfort units than do a temperature of 86°F. and relative humidity of 25 per cent. (The humidities cited are the mean 5 p. m. values for San Francisco and Reno, respectively, for July.) Indeed, the first would be a very warm, oppressive day, while the latter would be a comfortable and moderately warm one. I think that the Angot tables would reach their highest degree of usefulness and convenience if, in some manner, the relative humidity were made an integral part of such tables. If this were done in the case of Paris and Reno, perhaps the Paris summers would not turn out to be so cold as the Angot table *without humidities* seems to make them out. Why not use the mean relative humidity at the observation next following the occurrence of the daily maximum temperature? This, I believe, would be sufficiently accurate for practical purposes. Or, in order to avoid the integrating of temperatures and humidities, why not use the mean *wet-bulb* temperature at the observation next following the time of occurrence of the maximum temperatures? In other words, the "sensible temperature," so called.

The importance of humidity data in this connection may be understood by considering some of the climatic conditions that entered into the make-up of an usually warm day in Reno, namely, August 5, 1914. At 1 p. m., the thermometer stood at 98°F. (37°C.); and there was a 3-mile-an-hour breeze blowing from the southeast at the time. At the 5 p. m. observation following, or four hours later, the wet-bulb temperature was 62°F., and the relative humidity only 18 per cent. The sky was cloudless. These are typical warm-weather conditions, and the reader familiar with wet-bulb temperatures and relative humidity data will readily understand why intolerably hot, muggy weather and sunstrokes are unknown in Reno.

WEATHER AND RADIUM EMANATION AT MANILA, P. I.

During the year July, 1913, to July, 1914, J. R. Wright and O. F. Smith, of Manila, P. I., have continued their observations on the amount of radium emanation in the atmosphere of that city, with the object of determining more definitely to what extent the amount of radium emanation in the air is dependent on weather conditions. The details of the work are presented in the "Physical Review" for June, 1915, and we reprint below the general conclusions reached.[1]

Summary of results.

1. The variation of the amount of radium emanation in the atmosphere *at Manila* has been determined for a period of about 13 months. The annual and diurnal variation has been studied in connection with the principal meteorological factors. The effect of weather conditions on the rate at which radium emanation is exhaled from the surface of the ground has been investigated with the object of determining its connection with the emanation content of the atmosphere. The relation between the rate of exhalation and the radioactivity of soil gas at different depths has also been investigated.

2. The variation of the radium-emanation content of the atmosphere has been found to follow quite closely the variations in rainfall and wind movement. [See Table 1.] The ratio of the maximum to the minimum for the year was found to be approximately as 10 to 1. The mean of the monthly means gives for the radium equivalent of the emanation per cubic meter of air a value of 71.0×10^{-12} grams. The month of January shows the highest monthly mean for the radium-emanation content, the minimum value for the rainfall, and a low value for the total wind movement. The month of July gives the lowest monthly mean for the emanation content, the maximum value for the rainfall, and the highest total wind movement. Every other month of the year shows a very similar relation. No direct connection has been discovered between the emanation content and atmospheric pressure or humidity. The effect of the direction of the wind seems at best very indefinite.

TABLE 1.—*Annual variation of the radiation-emanation content at Manila.*

[Number in brackets in last column shows the number of observations entering into the monthly mean.]

Month.	Pressure (mean).	Humidity (mean).	Wind, total movement for month.	Rain (total).	Radium emanation per cubic meter expressed in its radium equivalent.
1913.	*Mm.*	*Per cent.*	*Km.*	*Mm.*	*Grams* $\times 10^{-12}$.
July	756.26	86.2	10,374.6	570.6	23.6 [3]
August	756.93	87.0	8,843.5	349.1	27.6 [3]
September	757.67	86.4	8,664.5	365.5	43.1 [4]
October	758.51	83.4	4,152.0	119.7	62.1 [3]
November	761.04	81.7	3,667.5	31.1	62.7 [2]
December	761.32	80.9	4,021.0	37.8	89.3 [3]
1914.					
January	763.24	76.2	4,925.5	3.5	117.1 [2]
February	762.26	73.8	5,255.5	7.3	108.3 [2]
March	760.77	68.6	6,344.0	6.1	108.6 [1]
April	760.17	70.8	5,921.0	53.4	68.9 [1]
May	758.42	72.6	6,137.5	84.0	83.7 [2]
June	757.62	81.7	6,714.0	367.9	59.0 [2]
July					19.2 [1]
Mean of monthly means					71.0

[1] Wright, J. R., & Smith, O. F. The variation with meteorological conditions of radium emanation in the atmosphere, in the soil gas, and in the air exhaled from the surface of the ground at Manila. Phys. rev., Lancaster, Pa., June, 1915, 5: 459-482.

3. A decided diurnal variation has been found to exist, the emanation content being considerably greater during the night than during the day. Observations for the interval from 11 p. m. to 5 a. m. gave a mean value 3.31 times greater than the mean value for the interval from 11 a. m. to 5 p. m. This variation has been found to be closely related to the variation in the total wind movement during the period, a high value of the wind movement corresponding to a low value of the emanation content.

4. The rate at which radium emanation is exhaled from the surface of the ground shows a decided decrease after periods of heavy rain. This decrease has been found in some cases to be almost 60 per cent of the rate of exhalation for fair weather.

5. The radium-emanation content of soil gas has been determined for depths of 30, 70, and 120 cm., respectively, and the variation with weather conditions studied. The variation of the radioactivity of the gas from the 30 cm. pipe was found to follow closely the variation in the emanation exhaled, a decrease in the exhalation resulting in a corresponding increase in the emanation content of the ground gas. The 70 cm. and 120 cm. pipes showed only slight variations with the weather conditions. The average value of the emanation content for the gas collected from the 120 cm. pipe was found to be 304.5×10^{-12} grams per liter, or over 4,000 times the mean value for atmospheric air. The mean value for the 30 cm. pipe was only about one-seventh that for the 120 cm. pipe.

METEOROLOGICAL PAPERS PRESENTED AT THE HAVRE MEETING OF THE FRENCH ASSOCIATION.

At the 43d session of the Association Française pour l'Avancement des Sciences, held at Havre in July, 1914, there were presented a number of interesting papers dealing with subjects of interest to the meteorologist. The following abstracts have been translated from the Comptes rendus of the 43d session, Paris, 1915, p. 101, ffg. — C. A., jr.

Reforestation and "occult" condensations.—An abundant and regular supply of water is the vital essential of inland navigation, of the "white coal" [waterpower] supply, and of agriculture. The "occult" condensations dew and white frost, are not recorded by the raingage but they supplement the rainfall with a quantity of water which is controlled and regulated in advance of its precipitation and which would be considerably increased by reforestation. For the quantity of frost (givre) coating a tree at the close of a clear winter night is much greater than the quantity that collected during the same night on a piece of naked ground whose area equals that of the projection of the tree. Reforestation, already serving as an element in the control of the water supply, may therefore be employed to increase the supply of water under man's control, and it is desirable to determine the extent to which reforestation can contribute.

After discussion, the section of the Association resolved that we should undertake studies designed to determine the degree to which reforestation can supplement the water supply by thus reinforcing the "occult" condensations, such as dew and frost.—*Paul Descombes.*

Weather forecasts by Guilbert's rules.—The author called attention to the circumstance that his rules for forecasting (Principes)[1] as published in 1891 have been designated by certain official meteorologists as being "as useless as possible" and "without either scientific or practical value of any kind." Experience alone can decide whether or no these criticisms are exaggerated.

Guilbert's method has now been applied in forecasting for a Parisian journal since October 1, 1912, with the result that the proportion of verifications has been 80 per cent. During the winter semester of 1913–14 this proportion rose to 86 per cent; while the proportion of verifications rose to 89 per cent for those predictions essentially peculiar to his method, viz, the changes in the barometric depressions resulting in their intensification, weakening, or disappearance.

The relation of cause to effect as established by the author between the force-direction of the wind and the consecutive variation in the barometric pressure has proved so exact that it has been possible in many of his forcasts to designate (1) the relative importance of the future barometric change, (2) its location, (3) its limits, and (4) even the name of the station where the barometric rise (hausse barométrique) will attain its maximum. Thus, among all the stations in France, for example, the author has been able to designate the occurrence of this maximum as now at Nantes, now at Nice, or Paris, or Charleville, or at Havre, etc.

This "new method" forecasts every meteorological phenomenon—rain and wind, temperature, fog, thunderstorms, etc.—simultaneously with its principal cause, the pressure change. The new method is, therefore, not merely practical and utilizable but also scientific, since every forecast is made according to principles and rules established on constant facts; moreover, the rules may be applied by every meteorologist. A method that during 21 months has permitted a daily forecast of atmospheric phenomena which meteorological science does not even attempt to foresee, must be regarded as a step in advance and ought to put an end to the existing empiricism of official meteorological forecasts.—*Gabriel Guilbert.*

Barograms and thermograms in relation to cosmical phenomena.—The study of nebulæ leads the author to the supposition that the combustion phenomena [in nebulæ] further the escape of gaseous masses which resemble the matter composing the stars, and that these masses become residual matter in interstellar space.

When comets approach the sun (i. e., approach their perihelion) they undergo quite irregular variations in form and brilliancy; they have been observed (Morehouse) to give off explosions and even to be destroyed (Biéla) by an explosion. All these phenomena are explicable only as due to the influence of an exterior gaseous medium. Therefore, he concludes that the interplanetary spaces of the solar nebulosity, as well as of the others, contain residual gases.

This concept seems to furnish an explanation of meteorological phenomena. While preparing for Le Temps (Paris) the daily temperature- and pressure-curves observed at the observatory Tour Saint-Jacques in Paris, there was noticed a certain parallelism between these simultaneous curves. This parallelism could be very simply explained by referring it to the rising and falling of that upper atmospheric stratum called the "stratosphere." It then becomes necessary to seek the general cause of atmospheric variations in the region above that stratum by ascribing them to the passage of independent gaseous masses that happen to come into contact [with the earth's atmosphere] and are influenced by the terrestrial rotation.

[1] See this REVIEW, May, 1907, 35: 210-212.—EDITOR.